

The Scientific Ideas of G. K. Gilbert: An Assessment on the Occasion of the Centennial of the United States Geological Survey (1879-1979)

Ellis L. Yochelson (Ed.), *Spec. Pap. 183*, Geological Society of America, New York, 148 pp., \$17.00.

Reviewed by William Benson

"If G. K. Gilbert isn't the best geologist this country has ever produced, he surely is the one to beat for the title." Thus spoke one of my early mentors on the U.S. Geological Survey, and nothing I have since read, seen, or heard persuades me otherwise. Harold Urey, fresh from the discovery that Gilbert had anticipated by 50 years many of Urey's own ideas about the moon, marveled both at Gilbert's breadth and at his knack "for being right," for right he was on almost all of the varied phenomena toward which he turned his agile mind. Though not so stated (nor perhaps so planned) this theme parades *Special Paper 183*. As Hunt states (p. 25): "His accomplishments are especially impressive when viewed in the perspective of the status of geologic knowledge at the time."

Gilbert's long and illustrious scientific career was completely intertwined with the beginnings and the early decades of the U.S. Geological Survey, and it seems fitting that the Survey's centennial include a reprise of Grove Karl Gilbert. Such is the purpose of this volume.

The Gilbert commemoration was originally planned as a symposium for the 1979 annual meeting of the Geological Society of America. But Gilbert's many contributions defied compression into any half-day session. Those who attended the symposium, therefore, will find in this volume as many new papers as those they heard in San Diego.

In addition to Yochelson's engaging preface, the volume

comprises 14 chapters, two on Gilbert, his career and his methods, and 12 on his varied contributions to science. Just the list of chapter titles (condensed and paraphrased below) is impressive:

1. A great engine of research, S. J. Pyne
2. Gilbert's contributions to glacial geology east of the Mississippi, G. W. White
3. Gilbert on laccoliths and intrusive structures, C. B. Hunt
4. Gilbert's studies of faults, scarps, and earthquakes, R. E. Wallace
5. Gilbert's Lake Bonneville studies, C. G. Hunt
6. Pioneering work of Gilbert on gravity and isostasy, D. R. Mabey
7. Gilbert and the moon, Farouk El-Baz
8. Gilbert and ground water, A. F. Agnew
9. Gilbert—bedding rhythms and geochronology, A. G. Fischer
10. Gilbert and the original barrier shorelines, J. C. Kraft
11. Gilbert and iceberg-calving glaciers, Mair and Post
12. Techniques and interpretations: Gilbert's sediment studies, L. B. Leopold
13. Gilbert's geomorphology, Chorley and Beckinsale
14. Analogies in Gilbert's philosophy of science, D. B. Kitts

Indeed the only abets of geology that did not come under Gilbert's analytical scrutiny were petrography, paleontology, and stratigraphy (though one might make a partial case for stratigraphy in view of his work on bedding rhythms). The scope is all the more remarkable when one realizes that nearly 20 years of his middle were so taken up by administrative duties that his research was all but abandoned. As Powell's de facto deputy, Gilbert acquired himself nobly as an administrator, but geologic research was the loser.

Even long-time admirers of Gilbert may discover new tid-

bles in this set of papers. How many, for instance, know that in the 1890's he tried (unsuccessfully) to persuade the Carnegie Institution of Washington to sponsor a "deep drill hole for geophysical research"? Or that his Presidential Address to the American Association of Geographers is the first U.S. paper to deal seriously with earthquake prediction? Or that this paper suggests all the major components of our modern programs? That he even proposed a version of the gap method for locating future quakes? These and many more await the reader.

Gilbert's exemplary literary style is not treated separately, but shows through in the quotations from his papers. As any Gilbert fan knows, he wrote as clearly as he thought, well realizing both the value of accurate communication and the fact that sloppy rhetoric may often conceal imperfect logic. In reply to a friend who had inquired how some recent graduates were faring on the Survey, Gilbert wrote a pithy: "Their geology is all right; teach them to write better English." The admonition obviously bears repetition today.

If *Special Paper 183* has a defect it is the uneven style of the papers, an inevitable consequence of any collection of individual efforts. A few, notably those of Charles Hunt and Bob Wallace, are as brightly enough to rank with Gilbert's own prose. Most of the others are clear and readable, but a couple are ponderous and laborious. No, I'm not going to tell you which, because even they are worth reading.

Historical or commemorative volumes are more often displayed on shelves and tables than are read. This one deserves a better fate. It has a lot of interesting information, not only about G. K. Gilbert and his factual discoveries but about his wonderfully rational methodologies as well. Who knows? Reading this book may even inspire a trek to the library to sample the original Gilbert, a completely rewarding experience in itself.

William Benson is with the National Research Council, Washington, D.C.

PLANETARY SCIENCE POSTDOCTORAL POSITIONS

University of Hawaii
Institute for Astronomy

The Institute for Astronomy anticipates one or more positions to be available in the fall semester 1981 of the postdoctoral level. The positions are full-time, federally funded and annually renewable for a maximum of three years, subject to availability of funds. The selected candidates will carry out theoretical and observational research on a NASA grant for ground-based planetary astronomy. Emphasis is placed on the outer planets and their satellites, comets, and asteroids.

Minimum qualifications are a Ph.D. in astronomy or related field with experience in theory and data interpretation in planetary science, with a proven record as a researcher as demonstrated by publications and recommendations of peers. Salary will be commensurate with qualifications.

Submit a curriculum vitae with a list of publications and arrange for two letters of recommendation to be sent to: Dr. John T. Jaffe, Director, Institute for Astronomy, 2680 Woodlawn Drive, Honolulu, HI 96822. Telephone (808) 948-8566.

Applications should be postmarked no later than August 15, 1981.

The University of Hawaii is an equal opportunity/affirmative action employer.

Visiting Lecturer in Geophysics. Geology Department seeks one year visiting lecturer 1981-82 to teach exploration geophysics and assist with operation of earthquake laboratory (includes WSSN Station). Require Ph.D. or nearly completed Ph.D. Apply to the Geology Department, University of Montana, Missoula, MT 59812. Deadline August 1, 1981. Telephone (406) 243-2341. EEO/AA employer.

Research Geologist/Solid Earth Geophysicist. ENSCO, Inc. in Springfield, Virginia is seeking a Program Manager/Research Geologist to support an expanding program in solid earth geophysics. Research areas will include: seismic network data processing associated with the detection, identification and location of natural and man-made seismic sources; earthquake characterization and source mechanism studies; explosion source char-

acterization; and empirical studies using near field and teleseismic data. Experience in theoretical and observational seismology at regional and teleseismic distances, is highly desirable. Experience in digital time series analysis is desirable. Ph.D. in seismology is highly desirable, however, M.S. level with experience in earthquake and explosion seismology will be considered. Salary and benefits are extremely competitive. Resumes along with salary requirements should be submitted to the Personnel Department at the address below. Attention: Code SAS, ENSCO, Inc., 8408-A Port Royal Road, Springfield, VA 22151. Equal employment opportunity/AAEP.

Seismology. Research associate position anticipated (September 1, 1981), teleseismic monitoring project in Virginia. Problems focus on seismicity and neotectonics in the state. Prefer M.S. geophysicist with thesis in observational seismology, but others considered. Applications, transcripts and two letters of recommendation to: Dr. G. A. Bolinger, Seismological Observatory, VPI&SU, Blacksburg, Virginia 24061. Deadline for receipt of applications is August 1, 1981. VPI&SU is an equal opportunity/affirmative action employer.

Mineralogy and Petrology. Applications are invited for a faculty position at Weber State College, effective September 1981. This is a permanent faculty position with rank, salary, and tenure track status determined by qualifications. Responsibilities include teaching undergraduate courses in mineralogy, petrology, and geochemistry and some combination of mineral deposits, structural geology and introductory geology. Ph.D. preferred. WSC is a large (10,000 students) undergraduate college with a strong geology program graduating about 10-15 majors per year. The college is situated in northern Utah at the boundary between the Rocky Mountain and Great Basin Provinces and adjacent to the Great Salt Lake. The Department is well equipped for field-oriented teaching and research. The closing date for applications is July 1, 1981. Applications, including evidence of teaching proficiency and the names of three references should

be sent to S. R. Ash, Chairman, Department of Geology/Geography, Weber State College, 3750 Harrison Blvd., Ogden, Utah 84403. An equal opportunity/affirmative action employer, M.F.

STUDENT OPPORTUNITIES

Graduate Student Research Assistantships, St. Louis University, Paleomagnetic Laboratory. Two positions are open for paleomagnetic research work conducted under NSF sponsorship. The positions are for one year and are renewable. The candidates are expected to apply simultaneously for admission to graduate school to pursue studies leading to a M.S. and/or Ph.D. degree in geophysics. For more information, contact: Dr. S. A. Vincze, Department of Earth & Atmos. Sciences, St. Louis University, P.O. Box 8098, St. Louis, MO 63158. Telephone (314) 955-3128 and simultaneously, Dean of Graduate School, St. Louis University, 221 N. Grand Blvd., St. Louis, MO 63103.

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Marine Geologist/Oceanographer. Ph.D. in geology, 12 years experience conducting physical oceanographic and sedimentologic studies in continental shelf, coastal, and fresh water environments. Thirty professional publications. Seeking challenging position in the New England area. Box 004, American Geophysical Union, 2000 Florida Avenue, N.W., Washington, D.C. 20008.

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Petrology Position Open. The Department of Geological Sciences of Columbia University invites applications for a research appointment in either igneous or metamorphic petrology, possibly with an orientation towards ore deposits. The successful candidate would have research interests involving quantitative analysis of rocks. Research would be carried out at the Lamont-Doherty Geological Observatory. Special funding arrangements and participation in the instruction program are expected. Rank and salary dependent upon qualifications. Candidates should submit curriculum vitae and the names of three references to Professor W. S. Broecker, Lamont-Doherty Geological Observatory, Palisades New York, 10964 by June 30, 1981. Columbia University is an equal opportunity employer.

Research Seismologist. The Alexandria Laboratories of Teledyne Geotech invites applications from Ph.D. level seismologists to work on problems related to the comprehensive and threshold test bed treaty negotiations. Applicants should have background in such topics as theoretical seismology, seismic data analysis, seismic data gathering, advanced seismic computing, and computer systems. To apply please send your resume to: John H. P. Personnel Department, Teledyne Geotech, 314 Montgomery Street, Alexandria, Virginia 22314. An equal opportunity employer.

Plasma Theorist. Depending on the availability of funds, the Center for Atmospheric and Space Sciences, Utah State University, could have a one year, postdoctoral position in theoretical plasma physics. Candidates should have a Ph.D. degree and a background in nonlinear plasma physics and computer modeling. The appointee will primarily be involved with the development of both 1-D and 2-D numerical models of double layers and electrostatic shocks. Please send a resume and the names of three references to: R. W. Schunk, Physics Department, Utah State University, Logan, Utah 84322. Tel: (801) 750-2674. Application deadline is June 30, 1981. Position available August-September, 1981. Salary range commensurate with experience. Utah State University is an affirmative action/equal opportunity employer.

Research Position in Chemical Oceanography. California Institute of Technology, Division of Geological and Planetary Sciences. The position of research fellow is being offered at Caltech for research in oceanography. Investigation of the isotopic composition of neodymium and rare earth abundances in sea water and sediments is now being carried forward. The mechanism of injection of REE into sea water will be studied. The difference in $^{143}\text{Nd}/^{144}\text{Nd}$ in various water masses (Piergatti et al., Earth and Planet. Sci. Lett. 45, 223-235 and Pagnanelli and Wassenaar, Earth and Planet. Sci. Lett. 50, 128-138 [1980]) is now being carried forward as an exploratory venture in order to determine the origin and chemical behavior of REE in the ocean and the potential use of $^{143}\text{Nd}/^{144}\text{Nd}$ as a tracer. The laboratory facilities for sample preparation and analysis are fully functional and will be available. Applicants should have training in oceanography and a good perspective on general physical oceanographic models.

Send resume and references to Professor G. J. Wasserburg, Lunatic Asylum, California Institute of Technology, Pasadena, CA 91125. Caltech is an equal opportunity/affirmative action employer (M.F.H.).

Sedimentologist or Sedimentary Petrologist/University of California, Santa Barbara. Applications are invited for a tenure track appointment in soft rock geology to be filled in 1981-82. Rank dependent on qualifications and experience but preference will be given to the assistant professor level. Applicant should normally have a Ph.D. and strong field orientation and quantitative background. The candidate will be expected to develop a strong research program in elastic sedimentation as related to basin analysis. The candidate will also be expected to teach at both undergraduate and graduate levels and interact with students and faculty of the department, particularly in the general areas of elastic geodynamics, volcanic processes, paleomagnetism, as well as field geology. Additional duties may include teaching physical geology and summer field geology. Please send resume, other documentation of abilities, and four letters of recommendation by August 31, 1981 to Dr. Arthur G. Sylvester, Chairman, Department of Geological Sciences, University of California, Santa Barbara, CA 93106. Telephone (805) 893-2159. The University of California is an affirmative action/equal opportunity employer.

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Crustal Seismology, Princeton University. Candidates with an interest in any of the following are invited to apply for research staff appointments:

1. Marine seismic data analysis and structure of oceans and ocean margins.
 2. Narrow and wide angle reflection seismology applied to continental crustal geology.
 3. Wave propagation theory and techniques of seismic data analysis.
- Princeton University has an ongoing program for the creative reanalysis of existing multichannel reflection data—such as COCORP and USGS offshore data. Special projects are undertaken from time to time to collect field data in critical areas or

to test new methods of data collection and analysis. A high performance 32 bit minicomputer system for data analysis and theoretical work is to be installed later this year.

Applicants should send curriculum vitae and a list of three references to:
Robert A. Phinney
Department of Geological and Geophysical Sciences
Princeton University
Princeton, NJ 08544
Or inquire: 609-482-4118.
Date of appointment and salary are negotiable.
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Consejo Nacional de Investigaciones Científicas y Técnicas

CHIEF OCEANOGRAPHER

A postdoctoral scientist with several years experience in physical oceanography is required at IADO (Instituto Argentino de Oceanografía), a joint institution of the Consejo Nacional de Investigaciones Científicas y Técnicas (National Research Council), the Universidad del Sur, Bahía Blanca, and the Armada Argentina (Argentine Navy).

The applicant, in addition to research and postgraduate teaching in his own field, will also be responsible for the planning, coordination, and supervision of activities in other branches of oceanography at large.

The position is under the auspices of a joint program of the Consejo Nacional de Investigaciones Científicas y Técnicas (CONICET) and the Interamerican Development Bank (IDB). It will be initially of medium duration, and is renewable.

It will be located at Bahía Blanca. Salary and fringe benefits according to qualification. Knowledge of Spanish language will be considered an advantage. For consultations or submitting applications, contact:

Señor Presidente del Consejo Nacional de Investigaciones Científicas y Técnicas
Avda. Rivadavia 1917
(1033) Buenos Aires, Argentina.

Applications should include complete academic and professional background along with a list of publications as well as names and addresses of three references.

Meetings

Joint Oceanographic Assembly

The recently published second bulletin for the Joint Oceanographic Assembly includes a general schedule of sessions, registration information, and a registration form. Scheduled for August 2-13, 1982, at Dalhousie University in Halifax, Nova Scotia, the assembly is sponsored by the Scientific Committee on Oceanic Research (SCOR), the Commission for Marine Geology, the International Association of Biological Oceanography, the International Association of Meteorology and Atmospheric Physics, the Engineering Committee on Oceanic Resources, and the Canadian National Committee for SCOR.

To receive the bulletin and to be included on the list for future mailings, contact Leo O'Quinn, Executive Secretary, Joint Oceanographic Assembly 1982, 240 Sparks Street, 7th Floor West, Ottawa, Ontario K1A 0E6, Canada. ☐

Nonurban Troposphere Symposium

The second Symposium on the Composition of the Nonurban Troposphere will be held the week of May 25, 1982, in Williamsburg, Va. Objective of the meeting is to present the available information on the nonurban troposphere. The symposium is cosponsored by AGU, the American Meteorological Society, and the National Aeronautics and Space Administration.

Contributed papers are being solicited on the following topics: background and nonurban measurements of tropospheric gaseous and aerosol species; sources and sinks of tropospheric gases and aerosols; interactions of tropospheric gases and aerosols; transport of tropospheric species; stratosphere-troposphere exchange of trace species; models of nonurban troposphere; and interpretation and significance of the composition of the nonurban troposphere.

Deadlines for reviewer's abstracts (200-400 words) and shorter abstracts (100 words) for publication in the bulletin of the AMS is October 15. Direct abstracts and questions to Jack Fishman, Program Coordinator, NASA Langley Research Center, Mail Stop 401B, Hampton, VA 23665. ☐

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2nd U.S.-Japan Seminar on 'High-Pressure Research: Applications in Geophysics'

The second U.S.-Japan seminar on 'High-Pressure Research: Applications in Geophysics' was held in Hakone, Japan, January 12-15, 1981, under the auspices of the U.S.-Japan Cooperative Science Program between the Ja-

pan Society for the Promotion of Science (JSPS) and the U.S. National Science Foundation (NSF). The cosponsors were Syun-iti Akimoto (Japan) and Muriel H. Manginani (USA). The first such seminar was held in Honolulu, Ha-

ASSEMBLY TRAVEL

Third Scientific Assembly, International Association of Meteorology and Atmospheric Physics, August 17-28, 1981, Hamburg, Germany

Fourth Scientific Assembly, International Association of Geomagnetism and Aeronomy, August 3-15, 1981, Edinburgh, Scotland

Universal Travel Service, Inc., of Washington, D.C., has been selected as official travel agent for these two assemblies. Contact Anno Moni, Universal Travel Service, Inc., 1825 Connecticut Avenue, N.W., Washington, D.C. 20009 (telephone: 202/667-3202) as soon as possible, indicating your requirements. Every effort will be made to obtain the best schedule and the lowest air fares available, such as super-APEX or group fares.

APEX (advance purchase excursion fare) must be booked 21 days in advance; minimum 7 days, maximum 180 days; \$50.00 penalty for any change after ticket is issued. A limited number of seats set aside on each air carrier for this fare.

Group fare: minimum 40 passengers traveling together, may return individually; tickets issued 21 days in advance. For those attending both assemblies, effort will be made to obtain suitable flights and fares.

From home city to New York (JFK) there are special add-on fares and, in some instances, super saver or published super-APEX fares that can be used in conjunction with transatlantic flight.

Northwest Airlines has direct service from New York to Glasgow (Prestwick). Pan American has daily service from New York to Hamburg; Northwest, twice weekly.

If possible, the group fare, which is the lowest fare, will be used to have 40 passengers traveling over on the same date.

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August 1 JFK/Prestwick NW #38 depart 7:20 PM arrive August 2 8:00 AM
August 18 Prestwick/JFK NW #39 depart 1:10 arrive some day 4:50 PM

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August 29 Hamburg/JFK PAA #101 depart 9:05 AM arrive some day 12:35 PM
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